

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

### REMARKS

Claims 1-93 are pending in the present application. No additional claims fee is believed to be due.

#### Rejection Under 35 USC 103(a) Over Kelley in view of Spence

Claims 1, 3, 4, 22, 23, 32, 34, 35, 53, 55, 63, 65, 66, 84 and 85 are rejected under 35 USC 103(a) for being unpatentable over US Patent Number 6,306,281 to Kelley (hereinafter "Kelley") in view of US Patent Number 4,414,070 to Spence (hereinafter "Spence"). Specifically the Office Action states that it would have been obvious to modify the apparatus of Kelley to use as small an anode-cathode gap as possible, such as less than 0.6 mm as claimed because Spence teaches that decreased anode-cathode gap improves efficacy.

The Applicants respectfully disagree with the finding of obviousness. Initially, the Applicants wish to renew the previous arguments made in relation to Kelley. Namely, the Applicants submit that the Kelley reference is associated with higher power requirements than the apparatus of the present invention, and includes a greater anode-cathode gap size than the present apparatus. The Applicants submit that it would not have been obvious to modify the anode-cathode gap size of Kelley based upon the teachings of Spence. Applicants strongly urge that Spence is nonanalogous art with respect to the present application as it relates to the use of an entirely different apparatus, using a distinct anode-cathode device in a non-aqueous system. Initially, it is important to note that Spence is related to an anode positioning system for an electrolytic cell having multiple suspended anodes. (See Spence; Col 1; Lines 7-10; emphasis added). Conversely, the apparatus of Kelley includes a cathode consisting of an outer stainless pipe and an anode consisting of a carbon electrode or a dimensionally stable anode – wherein the anode is positioned in the center of the pipe and insulated from the cathode, (See Kelley; Col. 2; Lines 55-60). Neither the apparatus of Kelley nor that of the present invention are even remotely related to the anode positioning system with multiple suspended anodes of Spence.

Spence discloses, "Since cell efficiency is dependent on the anode-cathode distance, i.e. the vertical spacing between the anodes and the subjacent electrolyte-metal interface, it is necessary to adjust the vertical position of the anodes in correspondence with these changes in metal level," (See Spence; Col. 1, Lines 24-30). Spence defines

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

the subject anode as, "...a pool of the produced molten metal that collects at the bottom of the cell in contact with a carbon cell lining..." (See Spence; Col. 1; Lines 17-20). Both Kelley and the present invention employ anodes and cathodes of an entirely different nature than those of Spence. Kelley employs a cathode having an outer stainless pipe, while the present invention employs a non-barrier electrolytic cell comprising at least one pair of electrodes. The differences between the device of Spence and that of Kelley and the present invention are further underscored by Spence's disclosure that, "as cell operation proceeds, the molten metal [cathode] level in the cell varies, owing to the progressive accumulation and periodic removal of product metal," (See Spence; Col. 1; Lines 22-25; remark added). From the forgoing disclosure, it is clear that the "cathode" of Spence represents a dynamic pool of metal that varies in size and level – thereby necessitating the vertical movement of the subject anode. The Applicants submit that the dynamic pool of molten metal that constitutes the "cathode" of Spence is entirely different than the outer stainless steel pipe that constitutes the cathode of Kelley, and the electrolytic cell of the present invention.

Although Spence discloses that the distance between its suspended vertical anode and pool of molten metal "cathode" must be adjusted to make a cell efficient, Spence fails to disclose the specific gap size needed to increase cell efficiency. Even such a disclosure would fail to teach or suggest all of the material limitations of the present invention, as Spence employs an entirely different anode and "cathode". The present invention specifically discloses that the size of the gap between the anode and cathode of the present electrolytic cell should be less than about 0.6 mm to maximize the efficiency of the cell.

Indeed, the courts have held, "In order to rely on a reference as a basis for a rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the invention was concerned," See *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). The Applicants submit that Spence is neither related to the field of applicant's endeavor (i.e., devices and methods for generating mixed oxidants from aqueous solutions) nor is Spence reasonably pertinent to the particular problem with which the invention was concerned (Spence describes the use of an entirely different anode-cathode system for use in a non-aqueous environment that cannot even be reasonably adapted for use in the context of the present invention). Thus, the Applicants submit and strongly urge that it would not have been obvious to a person

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

of ordinary skill in the art to modify the reference of Kelley with the anode-cathode gap relationship disclosed by Spence. Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to claims 1, 3, 4, 22, 23, 32, 34, 35, 53, 55, 63, 65, 66, 84 and 85 under 35 USC 103(a) over Kelley in view of Spence.

Rejection Under 35 USC 103(a) Over Herrington in view of Spence

Claims 5-21 and 36-52 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of Spence. Specifically, the Office Action states that it would have been obvious to modify the apparatus of Herrington to use as small an anode-cathode gap as possible, such as less than 0.6 mm as claimed because Spence teaches that decreased anode-cathode gap improves efficiency.

The Applicants respectfully disagree with the finding of obviousness. The Applicants wish to renew their previous arguments with respect to Herrington. Namely, Herrington is limited entirely to batch devices having a single port that is employed as both the inlet through which the aqueous feed solution passes into the cell and the outlet from which the effluent can pass out of the cell. Further, Herrington is associated with devices having a large anode-cathode gap size and a high concentration of salt in the aqueous feed solution (greater than 30,000 ppm). Conversely, the electrolytic cell of the present invention comprises both an inlet port and an outlet port in fluid communication with the passage between the claimed anode and cathode.

The Applicants submit that the Spence reference does not even constitute relevant art with respect to the present application as it relates to the use of an entirely different apparatus, using a distinct anode-cathode device in a non-aqueous system. Spence is related to an anode positioning system for an electrolytic cell having multiple suspended anodes, (See Spence; Col 1; Lines 7-10), whereas Herrington is a batch system having a cathode suspended inside an outer housing that serves as an anode, or alternatively an anode suspended inside an outer housing that serves as a cathode, (See Herrington; Col. 5; Lines 49-55). In either instance, the anode-cathode system of Herrington is entirely different than that of Spence, and thus, there exists no motivation to combine the two distinct technologies. Such a combination would not even be possible considering the type of "cathode" disclosed by Spence. Indeed, the courts have held, "If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification," In re Gordon, 733 F.2d 900, 211 USPQ 1125 (Fed. Cir. 1984).

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

Spence discloses, "Since cell efficiency is dependent on the anode-cathode distance, i.e. the vertical spacing between the anodes and the subjacent electrolyte-metal interface, it is necessary to adjust the vertical position of the anodes in correspondence with these changes in metal level," (See Spence; Col. 1, Lines 24-30). Spence defines the subject cathode as, "...a pool of the produced molten metal that collects at the bottom of the cell in contact with a carbon cell lining..." (See Spence; Col. 1; Lines 17-20). Herrington and the present invention employ anodes and cathodes of an entirely different character than those of Spence. Herrington employs a cathode that may either be suspended inside an outer housing or the housing itself, while the present invention employs a non-barrier electrolytic cell comprising at least one pair of electrodes. Spence further discloses, "as cell operation proceeds, the molten metal [cathode] level in the cell varies, owing to the progressive accumulation and periodic removal of product metal," (See Spence; Col. 1.; Lines 22-25; remark added). From the forgoing disclosure, it is clear that the "cathode" of Spence represents a dynamic pool of metal that varies in level – thereby necessitating the vertical movement of the subject anode. The Applicants submit that the dynamic pool of molten metal that constitutes the "cathode" of Spence is entirely different than the suspension in an outer housing or the outer housing itself that constitutes the cathode of Herrington, or the electrolytic cell of the present invention.

Although Spence discloses that the distance between its suspended vertical anode and pool of molten metal "cathode" must be adjusted to make a cell efficient, Spence discloses nothing with respect to the approximate gap size distance or even the direction in which the size should be adjusted for cell efficiency. Even such a disclosure would fail to teach or suggest anything with respect to the present invention, as Spence employs an entirely different anode and "cathode". Conversely, the claims of the present application are clearly limited to electrolysis apparatus having an anode-cathode gap size of less than about 0.6 mm. Hence, Spence employs an anode-cathode system of an entirely different nature than that of Herrington and the present invention, and fails to disclose any specific relationship between anode-cathode distance and cell efficiency.

The courts have held, "In determining the differences between the prior art and the claims, the question under 35 USC 103 is not whether the differences themselves would have been obvious, but whether the claimed inventions as a whole would have been obvious," See *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983). The Applicants submit that it would not have been obvious to adjust the anode-cathode gap size of Herrington based on the disclosure of Spence, which relates to

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

entirely different system. In fact, the Applicants submit that a person of ordinary skill in the art would have been dissuaded from even engaging in the attempted combination, as Herrington clearly encourages the use of a large anode-cathode gap size and Spence only vaguely discloses that the size of the gap (in a non-analogous, non-aqueous system) should be adjusted to maximize efficacy. The courts have further ruled that "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention," W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 US 851 (1984). The Applicants submit that Herrington's disclosure of a large anode-cathode gap size would have dissuaded a person of ordinary skill in the art from combining the reference with Spence. Accordingly, the Applicants request reconsideration and withdrawal of the rejection to claims 5-21 and 36-52 under 35 USC 103(a).

35 USC 103(a) Over Herrington in view of Spence in further view of Weakly

Claims 5-21, 36-52 and 67-83 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of Spence in further view of US 2002/0157966 to Weakly (hereinafter "Weakly"). Specifically, the Office Action states that it would have been obvious to have modified the apparatus of Herrington to include the filter material of Weakly purportedly because Weakly teaches that the filter removes arsenic from treated water.

The Applicants wish to renew their previous arguments with respect to application of the Herrington and Spence references. Herrington is limited to single-stream devices having a large gap size and a high concentration of salt in the aqueous feed solution. Spence discloses an entirely different anode-cathode system than that of Herrington and the present invention, and fails to disclose any specific relationship between anode-cathode distance and cell efficiency. Thus, the Applicants submit that a person of ordinary skill in the art would have been dissuaded from even engaging in the attempted combination, as Herrington clearly encourages the use of a large anode-cathode gap size and Spence only vaguely discloses that the size of the gap (in an entirely non-analogous, non-aqueous system) may be adjusted to maximize efficacy.

Weakly fails to address the shortcomings associated with Herrington and Spence. Weakly is limited entirely to devices operable on an alternating current power supply only, thereby seemingly prohibiting battery operation (and thus portability) of the subject device. Thus, the Applicants submit that it would not have been obvious to combine the

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

single-stream, large gap batch device of Herrington with the non-analogous anode-cathode system of Spence, further with the alternating current-operated device of Weakly, to arrive at a split-stream device with a small gap size that operable on a direct current and with battery power. Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to claims 5-21, 36-52 and 67-83 under 35 USC 103(a).

35 USC 103(a) over Herrington in view of Spence in view of Beer

The Office Action states that Claims 25-26, 56-57 and 87-88 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of Spence in further view of Beer. Specifically, the Office Action states that it would have been obvious to one of ordinary skill in the art to have used the composite electrode of Beer for the anode of Herrington because the electrode of Beer is useful in water purification and has long live, low overvoltage and catalytic properties.

The Applicants respectfully disagree with the finding of obviousness. Again, the Applicants wish to renew their previous arguments with respect to Herrington and Spence. Herrington is limited entirely to batch devices having a single port that is employed as both the inlet through which the aqueous feed solution passes into the cell and the outlet from which the effluent can pass out of the cell. Further, Herrington is associated with devices having a large gap size and a high concentration of salt in the aqueous feed solution (greater than 30,000 ppm). Spence does not even constitute relevant art with respect to the present application as it relates to the use of an entirely different apparatus, using a distinct anode-cathode device in a non-aqueous system. Spence is related to an anode positioning system for an electrolytic cell having multiple suspended anodes, (See Spence; Col 1; Lines 7-10), whereas Herrington is a batch system having a cathode suspended inside an outer housing that serves as an anode, or alternatively an anode suspended inside an outer housing that serves as a cathode, (See Herrington; Col. 5; Lines 49-55).

Beer fails to address any of the shortcomings associated with Herrington and Spence. Beer discloses an electrode for use in an electrolytic process having a conductive base of a material which is resistant to the electrolyte and the products of electrolysis, and a coating on the base consisting of at least one oxide of a film-forming metal and a non-film-forming conductor. See Beer; Abstract. Beer discloses nothing with respect to an electrolysis system having at least one inlet in fluid communication with the cell, at least

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

one outlet in fluid communication with the cell and a small gap size between the subject anode and cathode.

Thus, even the attempted combination of Herrington, Spence and Beer would fail to yield an electrolysis device having each and every limitation of the present invention. In fact, the attempted combination would actually result in a singe-stream device having a single port and a large gap size (as Spence discloses nothing with respect to the direction in which the gap size should be adjusted to increase efficiency). The Applicants again submit that the present invention is related to a split-stream electrolysis device having at least one inlet and at least one outlet, along with a small anode-cathode gap size. Despite any purported teaching by Spence regarding anode-cathode gap size, the courts have ruled, "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious," In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Indeed, the proposed modification of the anode-cathode system of Herrington with the anode-cathode system of Spence would certainly change the principle of operation of Herrington. Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to Claims 25-26. 56-57 and 87-88 are rejected under 35 USC 103(a).

Rejection under 35 USC 103(a) over Herrington in view of Spence in view of Graham

The Office Action states that Claims 27-28, 58-59, 89 and 90 are rejected under 35 USC 103(a) as being unpatentable over Herrington in view of Spence in further view of Graham. Specifically, the Office Action states that it would have been obvious to one of ordinary skill in the art to have used the porous material of Graham for the anode of Herrington because the porous electrode of Graham resists vibrations and also provides high surface contact area for electrolytic reaction.

The Applicants respectfully disagree with the finding of obviousness. Again, the Applicants wish to renew their previous arguments with respect to Herrington and Spence. Herrington is limited entirely to batch devices having a single port that is employed as both the inlet through which the aqueous feed solution passes into the cell and the outlet from which the effluent can pass out of the cell. Further, Herrington is associated with devices having a large gap size and a high concentration of salt in the

Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752

aqueous feed solution (greater than 30,000 ppm). Spence does not even constitute relevant art with respect to the present application as it relates to the use of an entirely different apparatus, using a distinct anode-cathode device in a non-aqueous system. Spence is related to an anode positioning system for an electrolytic cell having multiple suspended anodes, (See Spence; Col 1; Lines 7-10), whereas Herrington is a batch system having a cathode suspended inside an outer housing that serves as an anode, or alternatively an anode suspended inside an outer housing that serves as a cathode, (See Herrington; Col. 5; Lines 49-55).

Graham fails to address the shortcomings associated with Herrington or Spence. Although Graham discloses a porous metallic foam useful in a catalytic converter, the reference discloses nothing with respect to a split stream device having at least one inlet in fluid communication with the cell and at least one outlet in fluid communication with the cell. Further, Graham discloses nothing with respect to an electrode having a small gap size between the subject anode and cathode. The courts have held, "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination," In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Herrington actually teaches away from the attempted combination by disclosing a device with a large gap size. Thus, the attempted combination would result in a single-stream device having a single port that is used as both the inlet and outlet of the device, with a large gap between the subject anode and cathode (to reiterate, Spence teaches nothing with respect to the direction in which the anode-cathode gap of a device like that of Herrington should be adjusted). Accordingly, the Applicants respectfully request reconsideration and withdrawal of the rejection to claims 27-28, 58-59, 89 and 90 under 35 USC 103(a).



Appl. No. 10/027,667  
Atty. Docket No. 8828  
Amdt. dated 05/02/2005  
Reply to Office Action of 02/02/2005  
Customer No. 27752


Conclusion

In light of the above remarks, it is requested that the Examiner reconsider and withdraw the rejections under 35 USC 102 and 103. Early and favorable action in the case is respectfully requested.

Applicants have made an earnest effort to place their application in proper form and to distinguish the invention as now claimed from the applied references. In view of the foregoing, Applicants respectfully request reconsideration of this application, entry of the amendments presented herein, and allowance of Claims 1-93.

Respectfully submitted,

THE PROCTER & GAMBLE COMPANY

By 

Signature

Frank Taffy

Typed or Printed Name

Registration No. 52,270

(513) 634-9315

02 May 2005  
Customer No. 27752